

**UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

NOKIA SOLUTIONS AND NETWORKS §  
US LLC and NOKIA SOLUTIONS AND §  
NETWORKS OY, §  
§  
Plaintiffs, §  
§  
§  
v. § Case No. 2:16-cv-0754-JRG-RSP  
§  
HUAWEI TECHNOLOGIES CO. LTD. and §  
HUAWEI DEVICE USA, INC. §  
§  
§  
§  
Defendants. §  
§  
§

**CLAIM CONSTRUCTION  
MEMORANDUM AND ORDER**

On May 2, 2017, the Court held an oral hearing to determine the proper construction of the disputed claim terms in U.S. Patent No. 8,437,416 (the “416 Patent”)<sup>1</sup>. The Court has considered the parties’ claim construction briefing (Dkt. Nos. 67, 71, and 72) and arguments. Based on the intrinsic and extrinsic evidence, the Court construes the disputed terms in this Memorandum Opinion and Order. *See Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831 (2015).

**BACKGROUND**

Plaintiffs Nokia Solutions and Networks US LLC and Nokia Solutions and Networks OY

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<sup>1</sup> U.S. Patent Nos. 9,148,877 and 9,185,688 are also asserted but no longer have any terms having construction disputes. (Dkt. No. 71 at 1, n.1.)

(collectively “Nokia”) assert the ‘416 Patent against Defendants Huawei Technologies Co. LTD. and Huawei Device USA, Inc., (collectively “Huawei”).

The ‘416 Patent relates to communications in a cellular network. The Abstract of the ‘416

Patent recites:

A reference signal cyclic shift (CS) is quantized as a combination of a cell specific CS with an outcome of a pseudo-random hopping, and an indication of the cell specific CS is broadcast in the cell. In one embodiment the CS is quantized as a modulo operation on a sum of the cell specific CS, the outcome of the pseudo-random hopping, and a user specific CS, in which case an indication of the user specific CS is sent in an uplink resource allocation and a user sends its cyclically shifted reference signal in the uplink resource allocated by the uplink resource allocation. The CS may also be quantized according to length of the reference signal as  $cyclic\_shift\_symbol = (cyclic\_shift\_value * length \text{ of the reference signal})/12$ ; where  $cyclic\_shift\_value$  is between zero and eleven and  $cyclic\_shift\_symbol$  is the amount of CS given in reference signal symbols.

‘416 Patent Abstract. More particularly, the ‘416 Patent describes that it is known that multiple user equipment (“UE”) devices may multiplex their uplink transmissions on the same frequency and time resource. *Id.* at 2:48-53. Collisions on the physical uplink control channel may result. *Id.* at 2:58-67. This can be problematic for transmissions between adjacent cells. (*Id.*) The patent describes a process in which a transmitted reference signal is modified by quantizing a cyclic shift of a reference signal as a combination of a cell specific cyclic shift with an outcome of a pseudo-random hopping. *Id.* at 3:63-4:1. Cross-correlation and interference improvements result. *Id.* at 6:9-11.

## **LEGAL PRINCIPLES**

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*,

381 F.3d 1111, 1115 (Fed. Cir. 2004)). To determine the meaning of the claims, courts start by considering the intrinsic evidence. *Id.* at 1313; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'n Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. The general rule—subject to certain specific exceptions discussed *infra*—is that each claim term is construed according to its ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003); *Azure Networks, LLC v. CSR PLC*, 771 F.3d 1336, 1347 (Fed. Cir. 2014) (“There is a heavy presumption that claim terms carry their accustomed meaning in the relevant community at the relevant time.”) (vacated on other grounds).

“The claim construction inquiry. . . begins and ends in all cases with the actual words of the claim.” *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998). “[I]n all aspects of claim construction, ‘the name of the game is the claim.’” *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1298 (Fed. Cir. 2014) (quoting *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)). A term’s context in the asserted claim can be instructive. *Phillips*, 415 F.3d at 1314. Other asserted or unasserted claims can also aid in determining the claim’s meaning, because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term’s meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314–15.

“[C]laims ‘must be read in view of the specification, of which they are a part.’” *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). But, “[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.”” *Comark Commc’ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. “[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

The prosecution history is another tool to supply the proper context for claim construction because, like the specification, the prosecution history provides evidence of how the U.S. Patent and Trademark Office (“PTO”) and the inventor understood the patent. *Phillips*, 415 F.3d at 1317. However, “because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes.” *Id.* at 1318; *see also Athletic Alternatives, Inc. v. Prince Mfg.*, 73 F.3d 1573, 1580 (Fed. Cir. 1996) (ambiguous prosecution history may be “unhelpful as an interpretive resource”).

Although extrinsic evidence can also be useful, it is “less significant than the intrinsic record in determining the legally operative meaning of claim language.” *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert’s conclusory, unsupported assertions as to a term’s definition are entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is “less reliable than the patent and its prosecution history in determining how to read claim terms.” *Id.* The Supreme Court recently explained the role of extrinsic evidence in claim construction:

In some cases, however, the district court will need to look beyond the patent’s intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period. *See, e.g., Seymour v. Osborne*, 11 Wall. 516, 546 (1871) (a patent may be “so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning”). In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the “evidentiary underpinnings” of claim construction that we discussed in *Markman*, and this subsidiary fact finding must be reviewed for clear error on appeal.

*Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015).

#### **A. Departing from the Ordinary Meaning of a Claim Term**

There are “only two exceptions to [the] general rule” that claim terms are construed according to their plain and ordinary meaning: “1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either

in the specification or during prosecution.”<sup>2</sup> *Golden Bridge Tech., Inc. v. Apple Inc.*, 758 F.3d 1362, 1365 (Fed. Cir. 2014) (quoting *Thorner v. Sony Computer Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)); *see also GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) (“[T]he specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal.”). The standards for finding lexicography or disavowal are “exacting.” *GE Lighting Solutions*, 750 F.3d at 1309.

To act as his own lexicographer, the patentee must “clearly set forth a definition of the disputed claim term,” and “clearly express an intent to define the term.” *Id.* (quoting *Thorner*, 669 F.3d at 1365); *see also Renishaw*, 158 F.3d at 1249. The patentee’s lexicography must appear “with reasonable clarity, deliberateness, and precision.” *Renishaw*, 158 F.3d at 1249.

To disavow or disclaim the full scope of a claim term, the patentee’s statements in the specification or prosecution history must amount to a “clear and unmistakable” surrender. *Cordis Corp. v. Boston Sci. Corp.*, 561 F.3d 1319, 1329 (Fed. Cir. 2009); *see also Thorner*, 669 F.3d at 1366 (“The patentee may demonstrate intent to deviate from the ordinary and accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope.”). “Where an applicant’s statements are amenable to multiple reasonable interpretations, they cannot be deemed clear and unmistakable.” *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013).

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<sup>2</sup> Some cases have characterized other principles of claim construction as “exceptions” to the general rule, such as the statutory requirement that a means-plus-function term is construed to cover the corresponding structure disclosed in the specification. *See, e.g., CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1367 (Fed. Cir. 2002).

## **B. Functional Claiming and 35 U.S.C. § 112, ¶ 6 (pre-AIA) / § 112(f) (AIA)<sup>3</sup>**

A patent claim may be expressed using functional language. *See* 35 U.S.C. § 112, ¶ 6; *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1347–49 & n.3 (Fed. Cir. 2015) (en banc in relevant portion). Section 112, Paragraph 6, provides that a structure may be claimed as a “means . . . for performing a specified function” and that an act may be claimed as a “step for performing a specified function.” *Masco Corp. v. United States*, 303 F.3d 1316, 1326 (Fed. Cir. 2002).

But § 112, ¶ 6 does not apply to all functional claim language. There is a rebuttable presumption that § 112, ¶ 6 applies when the claim language includes “means” or “step for” terms, and that it does not apply in the absence of those terms. *Masco Corp.*, 303 F.3d at 1326; *Williamson*, 792 F.3d at 1348. The presumption stands or falls according to whether one of ordinary skill in the art would understand the claim with the functional language, in the context of the entire specification, to denote sufficiently definite structure or acts for performing the function. *See Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015) (§ 112, ¶ 6 does not apply when “the claim language, read in light of the specification, recites sufficiently definite structure” (quotation marks omitted) (citing *Williamson*, 792 F.3d at 1349; *Robert Bosch, LLC v. Snap-On Inc.*, 769 F.3d 1094, 1099 (Fed. Cir. 2014))); *Williamson*, 792 F.3d at 1349 (§ 112, ¶ 6 does not apply when “the words of the claim are understood by persons of ordinary skill in the art to have sufficiently definite meaning as the name for structure”); *Masco Corp.*, 303 F.3d at 1326 (§ 112, ¶ 6 does not apply when the claim includes an “act” corresponding to “how the function is performed”); *Personalized Media Communications, L.L.C. v. International Trade Commission*, 161 F.3d 696, 704 (Fed. Cir. 1998) (§ 112, ¶ 6 does not apply when the claim

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<sup>3</sup> Because the applications resulting in the Asserted Patents were filed before September 16, 2012, the effective date of the AIA, the Court refers to the pre-AIA version of § 112.

includes “sufficient structure, material, or acts within the claim itself to perform entirely the recited function . . . even if the claim uses the term ‘means.’” (quotation marks and citation omitted)).

When it applies, § 112, ¶ 6 limits the scope of the functional term “to only the structure, materials, or acts described in the specification as corresponding to the claimed function and equivalents thereof.” *Williamson*, 792 F.3d at 1347. Construing a means-plus-function limitation involves multiple steps. “The first step . . . is a determination of the function of the means-plus-function limitation.” *Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc.*, 248 F.3d 1303, 1311 (Fed. Cir. 2001). “[T]he next step is to determine the corresponding structure disclosed in the specification and equivalents thereof.” *Id.* A “structure disclosed in the specification is ‘corresponding’ structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim.” *Id.* The focus of the “corresponding structure” inquiry is not merely whether a structure is capable of performing the recited function, but rather whether the corresponding structure is “clearly linked or associated with the [recited] function.” *Id.* The corresponding structure “must include all structure that actually performs the recited function.” *Default Proof Credit Card Sys. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005). However, § 112 does not permit “incorporation of structure from the written description beyond that necessary to perform the claimed function.” *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999).

For § 112, ¶ 6 limitations implemented by a programmed general purpose computer or microprocessor, the corresponding structure described in the patent specification must include an algorithm for performing the function. *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). The corresponding structure is not a general purpose computer but rather

the special purpose computer programmed to perform the disclosed algorithm. *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

### **C. Definiteness Under 35 U.S.C. § 112, ¶ 2 (pre-AIA) / § 112(b) (AIA)<sup>4</sup>**

Patent claims must particularly point out and distinctly claim the subject matter regarded as the invention. 35 U.S.C. § 112, ¶ 2. A claim, when viewed in light of the intrinsic evidence, must “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). If it does not, the claim fails § 112, ¶ 2 and is therefore invalid as indefinite. *Id.* at 2124. Whether a claim is indefinite is determined from the perspective of one of ordinary skill in the art as of the time the application for the patent was filed. *Id.* at 2130. As it is a challenge to the validity of a patent, the failure of any claim in suit to comply with § 112 must be shown by clear and convincing evidence. *Id.* at 2130 n.10. “[I]ndefiniteness is a question of law and in effect part of claim construction.” *ePlus, Inc. v. Lawson Software, Inc.*, 700 F.3d 509, 517 (Fed. Cir. 2012).

When a term of degree is used in a claim, “the court must determine whether the patent provides some standard for measuring that degree.” *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) (quotation marks omitted). Likewise, when a subjective term is used in a claim, “the court must determine whether the patent’s specification supplies some standard for measuring the scope of the [term].” *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1351 (Fed. Cir. 2005); *accord Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (citing *Datamize*, 417 F.3d at 1351).

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<sup>4</sup> Because the application resulting in the patent was filed before September 16, 2012, the effective date of the AIA, the Court refers to the pre-AIA version of § 112.

In the context of a claim governed by 35 U.S.C. § 112, ¶ 6, the claim is invalid as indefinite if the claim fails to disclose adequate corresponding structure to perform the claimed functions. *Williamson*, 792 F.3d at 1351–52. The disclosure is inadequate when one of ordinary skill in the art “would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim.” *Id.* at 1352.

### AGREED TERMS

The parties agreed to the following terms:

<b>Term</b>	<b>Agreed Construction</b>
“receiving means for receiving receive an indication of a cell specific cyclic shift” (’416 Patent Claim 28)	<b>Function:</b> receiving an indication of a cell specific cyclic shift <b>Structure:</b> receiver, transceiver, or other equivalents thereof
“sending means for sending a reference signal that is cyclically shifted according to the determined quantized cyclic shift” (’416 Patent Claim 28)	<b>Function:</b> sending a reference signal that is cyclically shifted according to the determined quantized cyclic shift <b>Structure:</b> transmitter, transceiver, or other equivalents thereof
“receiving receive” (’416 Patent Claim 28)	“receiving”
“quantized cyclic shift” (’416 Patent Claims 1, 2, 4, 10-12, 14, 16-18, 20, 26, 28)	“cyclic shift determined by mapping a larger set of input values to a smaller set – such as rounding values to some unit of precision”
“quantiz[e/ing] the cyclic shift” (’416 Patent Claims 6, 15, 22)	“determin[e/ing] the cyclic shift by mapping a larger set of input values to a smaller set – such as rounding values to some unit of precision”
“cyclic shift is quantized” (’416 Patent Claims 9, 25)	“cyclic shift is determined by mapping a larger set of input values to a smaller set – such as rounding values to some unit of precision”
“based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative	Plain and ordinary meaning

<p>acknowledgement and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused, where the transmission comprises in addition to acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgment data”</p> <p>(’688 Patent Claim 37)</p>	
<p>“based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative acknowledgement and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused, where the transmission is to comprise an unmodulated sequence in addition to the acknowledgement data”</p> <p>(’877 Patent Claim 34)</p>	<p>Plain and ordinary meaning</p>

(Dkt. No. 73-1 at 2-3, 8-18.)

## **DISPUTED TERMS**

### 1. Cyclic Shift Terms

**“cell specific cyclic shift” (’416 Patent Claims 1-3, 6, 11-13, 15, 17-19, 22, 28)**

<b>Nokia’s Proposed Construction</b>	<b>Huawei’s Proposed Construction</b>
Plain and ordinary meaning	“cyclic shift that is guaranteed not to be the same as that of adjacent cells”

**“user specific cyclic shift” (’416 Patent Claims 2, 3, 6, 12, 13, 15, 18, 19, 22)**

<b>Nokia’s Proposed Construction</b>	<b>Huawei’s Proposed Construction</b>
Plain and ordinary meaning	“cyclic shift that is guaranteed to not be the same as that of another user in the same cell”

The parties dispute whether the shift is “guaranteed” not to be the same as that of another cell/user.

### **Positions of the Parties**

Nokia contends that the plain meaning of the word “specific” does not mean that the cyclic shift must be “guaranteed” to be different from the shift used for all adjacent cells. Instead, “specific” means only that the shift is associated with *that* cell, or *that* user. Nokia contends that it does not mean that the same shift cannot also be associated with (and specific to) other cells or other users. Nokia contends that Huawei attempts to limit the terms to a single embodiment and that Huawei identifies no words or expression of lexicography or disclaimer in the intrinsic record.

Nokia contends that in view of the claims alone, the terms have a clear meaning, pointing to claims 1 and 2 as an example: “determining a cell specific cyclic shift from a received indication of the cell specific cyclic shift” (claim 1) and “wherein the quantized cyclic shift is determined using the cell specific cyclic shift, the outcome of the pseudo-random hopping, and a user specific cyclic shift” (claim 2). Nokia contends that a “cell specific cyclic shift” is simply a cyclic shift that is specific to a cell, and a “user specific cyclic shift” is a cyclic shift that is specific to a user. (Dkt. No. 67 at 6-7.)

Nokia contends that Huawei mischaracterizes a goal of the overall invention of the ’416 Patent. Nokia notes that the ’416 Patent discloses that “[t]he goal of the shift hopping in certain embodiments is to provide improved cross-correlation and interference averaging properties between the ZC sequences transmitted by multiple UEs.” ’416 Patent 6:9-13. Nokia contends that “guarantee” is absent from this description. Nokia contends that, instead, the stated goal is to improve cross-correlation and interference averaging properties. Nokia contends that a goal of the

invention of the '416 Patent is specifically described as improving interference properties, not eliminating all possible interference, as Huawei's proposed construction would require. (Dkt. No. 72 at 2-3.)

Nokia contends that the specification consistently uses "specific cyclic shift" more broadly to require only something specific or particular to a cell or a UE: a "cell-specific cyclic shift allocation" is described as simply "how many cyclic shifts are allocated in the given cell." '416 Patent 14:41-44. For "user specific cyclic shift," Nokia contends the specification makes clear the term's plain and ordinary meaning.

At block 1702 the e-NodeB broadcasts an indication of the cell specific cyclic shift. In the particular instance of FIG. 17 there are also user-specific cyclic shifts put into use, and so at block 1704 the e-NodeB sends to a particular user an indication of its user-specific cyclic shift in the uplink resource allocation for that particular user.

(*Id.* at 16:24-30). Nokia contends that these passages do not provide a "guarantee" that a "cell specific" or "user specific" cyclic shift will not be the same as that of an adjacent cell or another user in the same cell, respectively. (Dkt. No. 67 at 8-9.)

Nokia also contends that Huawei's "guarantee" limitation is impossible to obtain with embodiments disclosed in the patent. Specifically, Nokia contends that the patent describes that for a reference signal with a length of 12 symbols, only 12 available cyclic shifts exist. (Dkt. No. 67 at 9 (citing '416 Patent 11:34-42).) Nokia states Huawei's expert (Dr. Akl) takes a position, not contained in the specification, that an "adjacent" cell can only be one of six cells surrounding a given cell (*See* Dkt. No. 72 at 4). Nokia contends that this idealized representation of cell layout ignores the practical realities of RF signal propagation and network design. (*Id.* at 4-5 (citing Dkt. No. 72-1 (Miller Decl.) at ¶¶ 14-19).) Nokia contends that, in making this argument, Huawei admits that its construction excludes situations where more than 12 cells are "adjacent." Nokia

contends that it is possible that more than 12 cells could meet Huawei’s arbitrary definition of “adjacent,” and, thus, it is mathematically impossible to “guarantee” that the cell specific shift for a given cell is different than every “adjacent cell.” (Dkt. No. 67 at 9.) Nokia contends that such situations are readily possible. (Dkt. No. 72 at 5 (citing Dkt. No. 72-1 (Miller Decl.) at ¶¶ 18-19).) Nokia contends this same logic holds true for the “user specific cyclic shift” because a situation where there are more users in a cell than there are available cyclic shifts (in this example, 13 users or more) renders Huawei’s “guaranteed” limitation impossible to satisfy. (Dkt. No. 67 at 9.)

Nokia also contends that Huawei’s “guaranteed” limitations are improper in view of other aspects of the claimed invention, which include a pseudo-random hopping component in determining the cyclic shift of a reference signal that is sent by the UE to the eNB. (Dkt. No. 72 at 3.) Nokia contends that Huawei conflates the role of the cell specific and user specific cyclic shifts within the context of the ultimately claimed signal that is being sent in a manner having less interference. Nokia contends that claim 1 explains that the cyclic shift of the reference signal that is actually sent is the quantized result of “the cell specific cyclic shift with an outcome of a pseudo-random hopping.” (Dkt. No. 72 at 3 (citing ’416 Patent at 18:12-14).) Further, Nokia states that because the sent reference signal includes a pseudo-random component, it is impossible to guarantee that the UEs in a given cell or adjacent cells will always have different cyclically shifted reference signals. (*Id.*) Specifically, Nokia states that the practical reality of quantizing the outcome of the combination of cell specific cyclic shift and the outcome of pseudo-random hopping is that, even if the cell specific cyclic shift of “Cell A” is different than the cell specific cyclic shift of adjacent “Cell B,” it is still possible for the cyclic shift of the sent reference signal of a UE in “Cell A” to be the same as a UE in “Cell B” due to the influence of the pseudo-random hopping. (*Id.* at 4 (citing Dkt. No. 72-1 (Miller Decl.) at ¶ 17).) Nokia states that due to the

combination of shifting with “pseudo-random hopping,” it is impossible to “guarantee” that UEs in two adjacent cells would always send a reference signal with a different cyclic shift. Nokia contends that this argument also applies to the language of the “user specific cyclic shift” language of the claims. (*Id.*)

Nokia contends that Huawei’s sole support for improperly injecting the notion of a “guarantee” into both of these terms comes from the description of a single, specific embodiment including a “cell-specific constant rotation.” As to that embodiment, Nokia contends that the specification notes that a “cell-specific constant rotation for the cyclic shifts of slot #2 (with respect to the original hopping pattern of FIG. 5) **may be imposed** in order to guarantee that the shift rotation from the 1st slot to the 2nd slot is not the same between different (adjacent) cells.” ’416 Patent 8:12-17 (emphasis added). Nokia contends that this language is permissive (“may be imposed”). (Dkt. No. 67 at 10.)

Further, Nokia contends that the example itself does not require the restrictions imposed by Huawei’s proposed construction. More specifically, Nokia states that in LTE, the duration of one LTE radio “frame” is 10ms. A frame is divided into 10 subframes of 1ms each, and each subframe is divided into two slots of .5ms each. (Dkt. No. 67 at 10 (citing ’416 Patent Fig. 1B).) Nokia states that there are two slots in each transmission time interval (“TTI”). (*Id.* citing (’416 Patent 7:53-56).) Nokia contends that the specific embodiment Huawei references describes only a “cell-specific constant rotation for the cyclic shifts of slot #2,” and is directed to “randomization inside a TTI,” that is, randomization between two slots in the same TTI. (*Id.* citing (’416 Patent 7:49-8:27).) Nokia contends that the specification also discloses methods and apparatuses for “randomization outside a TTI” (*Id.* citing (’416 Patent 7:17-19; 9:19-49).)

Nokia further contends that the claims are agnostic as to whether randomization is occurring inside or outside of a given TTI. (Dkt. No. 67 at 10-11 (noting in claim 1: “determining a cell specific cyclic shift from a received indication of the cell specific cyclic shift”.) Nokia states that, thus, even the specific embodiment Huawei identifies—its only support for the use of “guaranteed”—contains no requirement that the shift is different between “adjacent” cells. (*Id.* at 11.) Nokia contends that is the only embodiment with the instance of the word “guarantee” appearing in the specification. Nokia contends the “cell specific cyclic shift” and the “user specific cyclic shift” are never described as a “guarantee” that the shifts will not be the “same as that of adjacent cells” or “the same as that of another user in the same cell.”

Huawei objects to Nokia’s construction as being so broad that every cell and every UE can be assigned the exact same cyclic shift, because such a shift would still be “specific” to that cell and UE. (Dkt. No. 71 at 1.) Huawei contends that Nokia’s view of the terms is contrary to the alleged invention—increasing randomization and orthogonality among UE transmissions received by base stations to reduce interference. Huawei points to the specification:

... a problem related to ZC sequences used in PUCCH [is] that there are not enough proper mother sequences for sufficient randomization, *so in some instances adjacent cells operate with the same ZC mother sequence* (sometimes termed the base sequence). Another issue related to PUCCH is that *different UEs transmitting data-non-associated control signals in the same cell are separated only by means of different cyclic shifts of the same ZC sequence*. The problem with this approach is that the sequences are not perfectly orthogonal against each other.

’416 Patent at 2:63-3:5 (emphases added). Huawei further notes that the specification explains that “the inventors have devised a different approach to address the problem of too few ZC mother codes available to orthogonalize all ZC sequences in use by the various UEs.” *Id.* at 3:58-61. Huawei notes that the detailed description begins: “Embodiments of this invention concern ZC cyclic shift hopping. The goal of the shift hopping in certain embodiments is to provide improved

cross-correlation and interference averaging properties between the ZC sequences transmitted by multiple UEs.” *Id.* at 6:9-13.

Huawei contends that Nokia’s view of the “plain and ordinary meaning” captures the scenario in which each adjacent cell has the same cell specific cyclic shift assigned to it—for example, “0”—and similarly each UE within a cell has the same user specific shift assigned to it—also “0.” Huawei contends that these scenarios would effectively drop out the very notion of a cell specific and user specific cyclic shift and, more importantly, cause the claims to fail to address the very purpose of the ’416 patent: increasing randomization and reducing interference, explained above. Huawei points to what the patent warns not to do: “This is seen to forego what the inventors see as the primary advantage of cyclic shifting: randomizing interference between different code channels when the same underlying mother ZC sequence is used.” *Id.* at 3:53-56

Huawei contends that a cell specific cyclic shift cannot help address the ’416 Patent’s goal of increasing randomization and helping ensure orthogonality if the cell specific shifts are the same. (Dkt. No. 71 at 3. (citing Dkt. No. 71-1 (Akl Decl.) ¶¶ 38-40).) Huawei contends that Nokia’s view that all the shifts may be the same among adjacent cells and the same among UEs within a cell, means the claims of the ’416 Patent necessarily recapture the prior art. Huawei contends that the Background describes cell specific, user specific, and pseudorandom hopping cyclic shifting, and relatedly states the problem is that cell specific and user specific shifting do not provide enough randomization. (*Id.* at 3-4 (citing ’416 Patent 2:48-50, 2:61-65, 3:1-5, 3:33-37).)

Huawei contends that the patent then purports to provide a new means for introducing randomization: “As will be seen below, the inventors have devised a different approach to address the problem of too few ZC mother codes available to orthogonalize all ZC sequences in use by the various UEs”—followed by an explanation of allegedly novel embodiments, including those

captured by the independent claims: quantizing a cyclic shift as a combination of a cell specific cyclic shift with an outcome of a pseudo-random hopping. (Dkt. No. 71 at 4.)

Huawei contends that Nokia captures the prior art because pseudo-random hopping cyclic shift alone is precisely what remains when applying Nokia's view of "cell specific" and "user specific," because it captures the scenario in which each adjacent cell has the same cyclic shift and where each UE within a cell has the same cyclic shift. (*Id.*)

Huawei contends that its construction is consistent with the intrinsic evidence and the stated goal of increasing randomization, which would result from, for example, ensuring that adjacent cells utilize different cyclic shifts in the event that the ZC sequences are identical or sufficiently similar to risk interference. (*Id.* (citing Dkt. No. 71-1 (Akl Decl.) ¶ 41).)

Huawei contends that the specification, with respect to "cell specific cyclic shift," consistently describes the cell specific shift as being unique across adjacent cells:

Additionally, to avoid interference among adjacent cells, a cell-specific constant rotation for the cyclic shifts of slot #2 (with respect to the original hopping pattern of FIG. 5) may be imposed in order **to guarantee that the shift rotation from the 1st slot to the 2nd slot is not the same between different (adjacent) cells.**

('416 Patent 8:12-17) (emphasis added), and

The cell-specific parameter 'increment' varies between [0, 1, . . . . (Num\_Shifts-1).] This **randomizes the shift among adjacent cells, to preempt the situation where adjacent cells shift from the same base ZC sequence.**

(*id.* at 8:24-27) (emphasis added), and

Similar to that noted above in the CAZAC sequence example, it follows that an additional cell-specific constant rotation may be imposed for the cyclic shifts of slot #2 (with respect to the original hopping pattern shown in FIG. 7), according to Equation 2 above and **for the same reason; to forego cross-correlation among adjacent cells shifting the same base ZC sequence.**

(*id.* at 8:56-62) (emphasis added).

Huawei contends that the specification consistently describes user specific cyclic shifting in a similar manner:

***Multiple UEs in a given cell share the same Zadoff-Chu sequence while keeping the orthogonality by using a cyclic shift specific to each UE.*** In this manner different ones of the UEs in a cell may multiplex their UL transmissions (e.g., non-data associated UL transmissions) on the same frequency and time resource (physical resource block/unit or PRB/PRU; currently 180 kHz in LTE). The orthogonality of the ZC sequences enables the receiving Node B to discern the different signals from one another.”

(*id.* at 2:48-56) (emphases added), and

So from each ZC sequence multiple reference signals are derived with a cyclic shift of the sequence. ***Multiple UEs in the given cell share the same Zadoff-Chu sequence while keeping the orthogonality by using a UE specific cyclic shift as detailed above.***

(*id.* at 14:62-66) (emphasis added). Huawei also contends that its construction conforms to the ordinary dictionary meaning of the terms. (Dkt. No. 71 at 5 (citing Dkt. No. 71-2 (Merriam-Webster’s Collegiate Dictionary) at 1198 (specific – 2a: “restricted to a particular individual, situation, relation, or effect”)).)

As to Nokia’s argument regarding the existence of only 12 cyclic shifts, Huawei contends that is a preferred embodiment of the LTE specification, not the patent, and the patent states that:

While described in the context of UTRANLTE, it is within the scope of the exemplary embodiments of this invention to use the above...procedures for other types of wireless networks and the teachings herein are not limited to a particular wireless communication protocol.

’416 Patent 16:53-58. As to Nokia’s comment that more than 12 cells could be adjacent, Huawei contends that in practice, both today and as of the time of the patent, cellular networks use no more than twelve adjacent cells. (Dkt. No. 71 at 7 (citing Dkt. No. 71-1 (Akl Decl.) at ¶ 42).) Huawei contends that it can simply never be the case that there are not enough symbols (and relatedly, cyclic shifts) available so that each adjacent cell is given a unique cell specific cyclic shift. (*Id.*)

As to Nokia’s argument that whether the shifts are “beyond the purview of the UE” because the asserted claims “are directed to UEs and methods performed by UEs,” Huawei contends Nokia acknowledges that the claimed UE “receives an indication of the cyclic shift associated with a cell.” (Dkt. No. 71 at 7 (citing Dkt. No. 67 at 7).) Huawei contends that the claimed UE must be configured to “determine” the cell specific cyclic shift based on an indication communicated from elsewhere (e.g., the eNodeB). Huawei contends that, thus, the claims still require the cell specific cyclic shift to exist and to have certain characteristics even though the shift is created elsewhere, and the claims explicitly call out “a received indication of the cell specific shift” (claims 1, 3, 11, 13, 17, 19 28).

As to Huawei’s argument that construction is necessary, because otherwise the claims could encompass a situation where every cell or UE is assigned the exact same cyclic shift, Nokia contends, in reply, that this argument has no basis in reality. Nokia contends that the specification and claims teach that a specific shift is assigned to each UE and to each cell, but because there are only 12 possible shifts available, there will necessarily be duplication when shifts are reused. (Dkt. No. 72 at 3 (citing ’416 Patent 3:13-21, 3:65-4:9; and Dkt. No. 72-1 (Miller Decl.) at ¶ 16.) Nokia contends that it is not attempting to capture the hypothetical scenario where all UEs and all cells have the same assigned shift, but is instead giving the claim language its plain meaning as explained in the specification and as required by practical application of the invention.

As to the dictionary definition, Nokia contends that the term “guarantee” does not appear in this definition. Nokia contends that, if anything, the definition of “specific,” found in Huawei’s exhibit, supports NSN’s position that cell specific and user specific shifts are simply cell and user shifts specific to cells and users, respectively. (Dkt. No. 71-2 at 4 (defining specific as “relating or applying specifically to or intended specifically for”).)

## **Analysis**

Huawei has not pointed to clear language in the intrinsic record of lexicography, disavowal, or disclaimer mandating that the shifts must provide Huawei's proposed "guarantee." *See GE Lighting Solutions*, 750 F.3d at 1309; *Cordis Corp.*, 561 F.3d at 1329. Rather, Huawei merely points to an embodiment of the specification. However, even a single embodiment is not necessarily enough to read a limitation into the claim from the specification. *Arlington Indus., Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246, 1254 (Fed. Cir. 2011) ("[E]ven where a patent describes only a single embodiment, claims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words of expressions of manifest exclusion or restriction.") (citation omitted). Moreover, the one passage Huawei cites to (8:18-27) as using "guarantee" uses the term in a limited context. Specifically, the passage references intra-TTI shifts between two slots: "to guarantee that the shift rotation from the 1st slot to the 2nd slot is not the same between different (adjacent) cells." '416 Patent 8:15-17. The passage does not require all shifts to not be the same between adjacent cells or between users in the same cell. Further, as noted by Nokia, the passage in question also utilizes permissive language, "may be imposed." *Id.* at 8:14-15.

As to Huawei's further argument that the fundamental purpose of the concepts disclosed is to eliminate interference, Huawei's arguments still do not mandate the limitations Huawei seeks. As noted by Huawei, the specification emphasizes that a "different approach" is utilized to address the problem of there being in existence of too few ZC mother codes. '416 Patent 3:58-61. The different approach is the inclusion of shifts, however, a "guarantee" of no overlap is not mandated. In fact, the specification describes a goal of "improved cross-correlation and interference averaging properties," not the elimination of interference. *Id.* at 6:9-13. Huawei contends that

without a “guarantee” the shifts could all be the same. However, such an interpretation would ignore the shift dependency on the cell or user as the term in the ordinary meaning implies.

As claimed, for example in claim 1, what is sent and is the signal in question for which reduced interference is desired is: “a reference signal that is cyclically shifted according to the determined quantized cyclic shift.” Further, the “determined quantized cyclic shift” is “a quantized cyclic shift of a reference signal as a combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping.” Though the combination reduces interference, as claimed, shifts are not described as being guaranteed not to be the same between adjacent cells or not to be the same of another user in the cell. Further, as noted by Nokia, the use of the additional component (pseudo-random hopping) adds a level of uncertainty to the final output such that the reference signals cannot be guaranteed not to interfere. (Dkt. No. 72 at 3-4 (citing Dkt. No. 72-1 (Miller Decl.) at ¶ 17).)

In addition, as to at least one embodiment, disclosure is provided that a choice of one of only twelve shifts may be utilized. ’416 Patent 3:13-21, 11:34-42. Though Huawei argues that the specification is not limited to such an embodiment, it is clear that a specific embodiment of twelve possible shifts is disclosed. The parties provide conflicting expert testimony as to what would be the normal number of adjacent cells and whether that number would exceed twelve. However, it is clear that the specification does not provide explicit restriction on the number of adjacent cells. Further, Huawei does not provide evidence that in normal operations any particular cell would be limited to only twelve users. Nokia, in contrast, provides expert evidence to the contrary. The Court finds Nokia’s extrinsic evidence is more persuasive. (Dkt. No. 72-1 (Miller Decl.) at ¶¶16-20.) Further, the specification describes with reference to an embodiment of 12 cyclic shifts that a “reuse pattern of 1/12 is possible.” ’416 Patent 9:26-30, 11:34-42. Considering the intrinsic

evidence and extrinsic evidence in the totality, the Court finds that Huawei’s construction would exclude a preferred embodiment. A construction that excludes embodiments is rarely correct. *See Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1326 (Fed. Cir. 2013) (holding that a construction that excludes the preferred embodiment “is rarely, if ever, correct.”).

By rejecting Huawei’s “guarantee” limitations, the Court has resolved the primary claim construction dispute presented by the parties: whether shifts must be guaranteed to not be the same between adjacent cells or between users within a cell. In ordinary usage of the claim term, further construction, thus, might not be needed. Huawei, however, has raised concern that Nokia may attempt to construe the term in a manner that the term was not limited to a meaning in which the shift was associated or tied in any manner to a cell or user. Thus, for example, Huawei contends that Nokia could attempt to construe the term to encompass a common shift applied to all cells or all users. Such a construction does not fall within the ordinary meaning. Nokia has explicitly acknowledged this. To provide guidance as to this ordinary meaning, at the oral hearing the Court proposed constructions of “differing cyclic shifts provided among differing cells” and “differing cyclic shifts provided among differing user equipment.” Nokia agreed to these constructions. The Court adopts these constructions to make clear that the shifts must be cell/user specific, though again a “guarantee” that the shifts are not the same is rejected by the Court.

**The Court construes the term “cell specific cyclic shift” to mean “differing cyclic shifts provided among differing cells” and construes the term “user specific cyclic shift” to mean “differing cyclic shifts provided among differing user equipment.”**

2. **“determining means for determining from the received indication the cell specific cyclic shift, and for determining a quantized cyclic shift of a reference signal as a**

**combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping” ('416 Patent Claim 28)**

<b>Nokia's Proposed Construction</b>	<b>Huawei's Proposed Construction</b>
<p><b>Function:</b> (Agreed)</p> <p>determining from the received indication the cell specific cyclic shift,</p> <p>and</p> <p>determining a quantized cyclic shift of a reference signal as a combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping</p> <p><b>Structure:</b> processor, memory, and/or associated software configured to perform the algorithm disclosed in blocks 1708 and 1706 of Fig. 17 and corresponding text, <i>e.g.</i>, 16:23-52; and equivalents thereof</p>	<p><b>Function:</b> (Agreed)</p> <p>determining from the received indication the cell specific cyclic shift,</p> <p>and</p> <p>determining a quantized cyclic shift of a reference signal as a combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping</p> <p><b>Structure:</b> The specification fails to set forth any algorithm for the function claimed in this software limitation. Claim is indefinite</p>

The parties dispute whether an algorithm for the claimed function is sufficiently disclosed.

**Positions of the Parties**

Nokia contends that, as claimed, the “determining means” determines “from the received indication the cell specific cyclic shift,” and that it determines “a quantized cyclic shift of a reference signal as a combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping.” Nokia contends that the specification discloses an algorithm for an embodiment of the determining means. Specifically, Nokia points to Figure 17 as being a process flow diagram showing an algorithm of the particular embodiment of claim 28. Nokia contends that the UE first “determine[s] the cell-specific cyclic shift from the broadcast indication” (Block 1708) and then

“quantize[s] the reference signal cyclic shift as a combination of the cell specific shift (Block 1702/1708) and an outcome of a pseudo-random hopping” (Block 1706):”

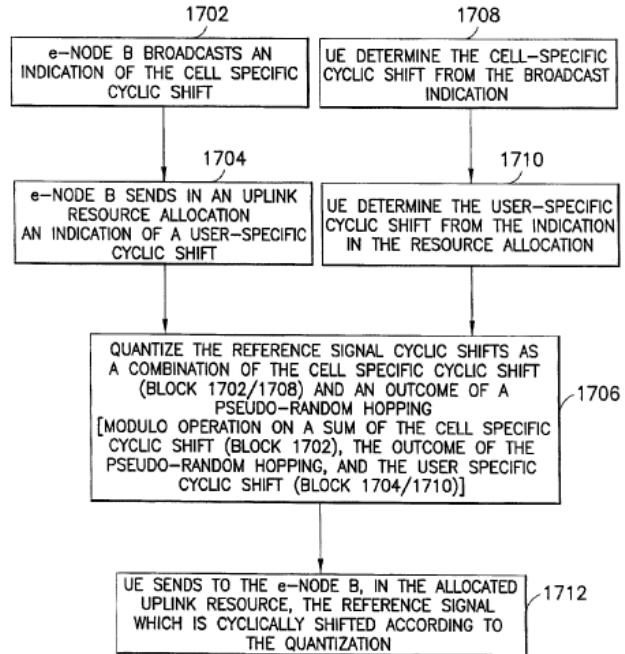


FIG.17

'416 Patent Figure 17. Nokia contends that the text of the specification describing this figure is similarly clear. (Dkt. No. 67 at 14 (citing '416 Patent 16:23-52).) Nokia contends that this algorithm is plainly sufficient for one skilled in the art to implement the invention.

Huawei notes that Nokia's construction recites “the algorithm disclosed in Blocks 1708 and 1706 of Fig. 17 and corresponding text, e.g., 16:23-52.” Huawei contends that Block 1708 corresponds to the first agreed function, “determining from the received indication the cell specific cyclic shift.” Huawei contends that this block merely restates the exact claimed function. Specifically, Huawei contends that Block 1708 states “UE determine the cell-specific cyclic shift from the broadcast indication” and this merely restates the respective claim language “determining from the received indication the cell specific cyclic shift.” Huawei contends that the figure and specification do not explain how the UE is to “determine the cell specific cyclic shift from an

indication of a cell specific cyclic shift.” (Dkt. No. 71 at 10.) Huawei contends that merely restating the function is not sufficient. (*Id. (citing Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1317, 1318-19 (Fed. Cir. 2012) (stating “This type of purely functional language, which simply restates the function associated with the means-plus-function limitation, is insufficient to provide the required corresponding structure” and “where a disclosed algorithm supports some, but not all, of the functions associated with a means-plus-function limitation, we treat the specification as if no algorithm has been disclosed at all”)).)

Huawei contends the “corresponding text” (16:23-52) also does not describe how the UE is to “determine the cell specific cyclic shift from an indication of a cell specific cyclic shift:”

Now the particular user equipment receives at block 1708 the broadcast indication of the cell-specific cyclic shift, receives at block 1710 in its uplink resource allocation the indication of the user-specific cyclic shift, and computes its cyclic shift just as the e-NodeB did. At block 1712 the UE sends to the e-NodeB, in the uplink resource that was allocated to it and which bore the indication of the user-specific cyclic shift, the reference signal which is cyclically shifted according to the modulo operation on the sum of the cell specific cyclic shift, the outcome of the pseudo-random hopping, and the user specific cyclic shift.

’416 Patent 16:23-52. Huawei contends that this merely suggests the UE “receives” the indication at Block 1708—the text does not even “determine” the cell specific cyclic shift based on that “received” indicator as required by the claim and shown in the block. (Dkt. No. 71 at 11.) Huawei contends that this corresponding text presumes the claimed “determination” is accomplished, because the cell specific cyclic shift is then used in step 1706 to “compute[] its cyclic shift just as the e-NodeB did.”

Huawei contends that the knowledge of one of ordinary skill in the art cannot be used to fill the gaps where a specification fails to disclose any corresponding structure. (Dkt. No. 71 at 11

(citing *EON Corp. IP Holdings LLC v. AT&T Mobility LLC*, 785 F.3d 616, 624 (Fed. Cir. 2012); *Function Media, L.L.C. v. Google, Inc.*, 708 F.3d 1310, 1319 (Fed. Cir. 2013)).)

In reply, Nokia contends that Huawei has conceded that there is sufficient structure for the second aspect of the agreed function. (Dkt. No. 72 at 6-7.) As to this portion, Nokia contends that the '416 Patent discloses the use of a “modulo operation on a sum” of the various shift components to determine a quantized cyclic shift. '416 Patent 16:30-39.

Nokia contends that the proper legal standard for an algorithm is “the patentee need not disclose every conceivable detail or implementation of an algorithm, so long as some algorithm is disclosed.” *Cellular Commc’ns Equip. LLC v. HTC Corp.*, No. 6:13-CV-507, 2016 WL 4204137, at \*5 (E.D. Tex. Aug. 9, 2016) (citing *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1385 (Fed. Cir. 2011)). Nokia states that “the sufficiency of the disclosure of algorithmic structure must be judged in light of what one of ordinary skill in the art would understand the disclosure to impart.” *Aristocrat Techs. Australia Pty Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1337 (Fed. Cir. 2008).

As to Huawei’s expert declaration from Dr. Akl, Nokia contends Dr. Akl merely made broad conclusory remarks and did not identify which aspect of the function algorithm is allegedly not disclosed and to explain why that aspect is allegedly missing an algorithm. (Dkt. No. 72 at 8.)

Nokia cites to its expert as indicating that one of ordinary skill in the art would understand the specification to disclose sufficient structure, including a corresponding algorithm, for the agreed-to function of the “determining means.” (*Id.* (citing Dkt. No. 72-1 (Miller Decl.) at ¶¶ 23-26.) Specifically, Nokia states the specification discloses the use of lookup tables for “determining from the received indication the cell specific cyclic shift.” (*Id.* citing ('416 Patent 12:1-7).) Nokia contends that a person of skill in the art would understand how the UE could determine the cell

specific cyclic shift from the received indication. (*Id.* (citing Dkt. No. 72-1 (Miller Decl.) at ¶¶ 25-26.) Nokia contends that even if the algorithm relied, in part, on the knowledge of a person of ordinary skill, this does not render the claim indefinite. *Enfish, LLC v. Microsoft Corp.*, 822 F. 3d 1327, 1340, 118 U.S.P.Q.2d 1684 (Fed. Cir. 2016) (“The fact that this algorithm relies, in part, on techniques known to a person of skill in the art does not render the composite algorithm insufficient under § 112 ¶ 6. Indeed, this is entirely consistent with the fact that the sufficiency of the structure is viewed through the lens of a person of skill in the art and without need to ‘disclose structures well known in the art.’”).

### **Analysis**

The primary dispute is with regard to the first function. Huawei may be correct that Block 1708 and the corresponding text do not provide an algorithm for the first function. However, in Nokia’s Reply Brief and Expert Declaration, Nokia points to an additional passage which references the use of lookup tables: 12:1-7. The passage describes the use of lookup tables in the UE and the Node B to implement “cyclic shift hopping in the manner described above.”

Implementation of the shift hopping patterns can be based on a lookup table located/stored in a MEM of the UE 10 and of the Node B 12. Separate lookup tables may be used for randomization inside the TTI and randomization outside the TTI as well as for the intra-cell and inter-cell interference randomization components of symbol-wise cyclic shift hopping in the manner described above.

’416 Patent 12-1:7. At the hearing, Huawei objected to this passage as only being relevant to pseudo-random hopping. (Dkt. No. 82 at 69-70.) However, the passages preceding this passage make clear that the “cyclic shift hopping” referenced include the cell specific and user specific shifts. ’416 Patent 10:48-11:67. Similarly, Nokia’s expert stated that:

This [Block 1708] discloses that the “received indication” is a broadcast indication. Additionally, a POSITA at the time of the invention would understand how to determine a cyclic shift using a broadcast indication, including, for example

through the use of a look-up table. The use of look up tables is known to persons of ordinary skill in the art and a POSITA could readily implement a lookup table for this function. Additionally, at 12:1-7 the specification of the 416 Patent describes the use of a lookup table.

(Dkt. No. 72-1 (Miller Decl.) at ¶25.) Based upon the intrinsic and extrinsic evidence, the Court finds that the specification provides a look up table algorithm for determining from the received indication the cell specific shift.

As to the second recited function, Nokia points to Block 1706 and the corresponding text. The relevant disclosure relates to the use of an algorithm which is comprised of a modulo operation. Huawei did not challenge this portion of the Nokia's construction in the briefing or at the oral hearing. The construction provided below provides algorithms which include additional descriptions of both the first and second functions. At the oral hearing, Nokia agreed to this construction. (Dkt. No. 82 at 69.)

**The Court construes “determining means for determining from the received indication the cell specific cyclic shift, and for determining a quantized cyclic shift of a reference signal as a combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping” to mean:**

**Function:**

- 1) determining from the received indication the cell specific cyclic shift, and**
- 2) determining a quantized cyclic shift of a reference signal as a combination of the cell specific cyclic shift with an outcome of a pseudo-random hopping**

**Structure:**

**processor, memory, and/or associated software configured to perform according to (1) an algorithm disclosed in the text at 12:1-7 to utilize a lookup table located/stored in the**

**apparatus; and (2) an algorithm disclosed in Block 1706 of Fig. 17 and the corresponding text at 16:23-52 to perform a modulo operation on the sum of the cell specific shift and the outcome of pseudo-random hopping; and equivalents thereof.**

### **CONCLUSION**

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit. The parties are ordered to not refer to each other's claim construction positions in the presence of the jury. Likewise, in the presence of the jury, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court. The Court's reasoning in this order binds the testimony of any witnesses, and any reference to the claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

**SIGNED this 19th day of May, 2017.**



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ROY S. PAYNE  
UNITED STATES MAGISTRATE JUDGE